

REMARKS

1. The Rejection

Claims 1-18 remain in this application. In the Office Action the Examiner has again rejected claims 16 and 17 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,530,620 (Sangveraphunsiri). Claims 1-5 and 8-11 are rejected under 35 U.S.C. §103(a) as being unpatentable over Sangveraphunsiri in view of U.S. Patent No. 5,603,618 (Hayakawa). Claims 6 and 7 are rejected under 35 U.S.C. §103(a) as being unpatentable over Sangveraphunsiri in view of Hayakawa and U.S. Patent No. 5,748,446 (Feightner). Finally, claims 12-15 and 18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Sangveraphunsiri in view of Hayakawa and U.S. Patent No. 5,576,935 (Freer). Applicant respectfully requests that the Examiner reconsider these rejections.

2. The Present Invention

It has been conventional to mount processors, including cartridge processors in a vertical orientation by plugging into a connector in a mother board. An example of such mounting is illustrated by Feightner et al., U.S. Patent 5,748,446. As clearly illustrated and described, the processor card assembly 40 has its single edge inserted in a connector on the mother board, with the assembly 40 extending vertically from and perpendicular to the mother board (See col. 3, lines 19-43). With such arrangements relatively complex retention structures are needed, again as evident from Feightner et al.

Deviating from the conventional arrangement, in embodiments of the present invention, the edge connector on the mother board is oriented so as to receive the edge of the processor assembly in a horizontal orientation. In other words when mounted on the mother board, the processor assembly is parallel to and spaced from the mother board. As described and claimed, guides can be provided to guide and retain the module and mounting can be such as to make the processor visible and replaceable from outside the computer casing.

Characteristics found in all of the claims include:

- a. An edge connector on the mother board.
- b. When mounted, the processor module is parallel to and displaced from the mother board. (In contrast to other prior art arrangements where the processor is mounted directly on the board).

3. The Prior Art

a. Sangveraphunsiri, U.S. Patent 5,530,620

Sangveraphunsiri is the Examiner's primary reference. This Patent is directed to accessible upgrade capability. Its primary attention is directed to ensuring that the cartridge cannot be inserted or removed with the power on. Particularly in Fig. 20, Fig. 21, and Fig. 22, it describes arrangements for plugging the cartridge into a motherboard. In the embodiment of Fig. 20, the arrangement is conventional. The cartridge 540 extends vertically from the motherboard 104. It is plugged into an edge connector 548 mounted on the motherboard. In the second embodiment shown in Fig. 21 and Fig. 22, a bay 562, customarily used for a floppy disk drive is modified to have an adapter 564 to receive a cartridge 520. A rear connector 566 is mounted in the bay 564 to receive the edge connector on the cartridge 520. A connector 576 and cable 578 are shown in Fig. 20 to at the end of the cable 578 is another connector 548' which mounts to the motherboard.

Thus, Sangveraphunsiri suggests two manners of mounting. The first is a conventional vertically extending arrangement where the processor is perpendicular to the motherboard. In the second, a bay normally use for a disk drive is converted to receive the processor module and a cable run from the bay to the motherboard. When mounted in this arrangement, the processor module is not plugged into a connector on the motherboard.

b. Hayakawa et al. U.S. Patent 5,663,618

Hayakawa et al. illustrates a printer device body 1. Mounted vertically within this device body is a printer control board 1-1. A controller board 2-1 plugs into the printer control board.

The controller board, although it contains a CPU 10, is not, however, a processor cartridge or even a processor board. It is a controller board that includes among other things a CPU. Furthermore, the structure shown and described does not have a case as do the claimed processor cartridge and Sangveraphunsiri. It does have guides to for guiding the board, which is the teaching which the Examiner refers to. However, beyond the possible suggestion of the use of guides, it teaches nothing about how to mount a processor module to a motherboard.

c. Feightner et al. U.S. Patent 5,748,446.

As alluded to above, Feightner et al. is directed a conventional perpendicular mount of the processor. Thus, as indicated above, it discloses a processor module 40 which is retained in a retention unit. This patent also discloses a heat sink and heat sink support apparatus the heat sink is attached to the processor card assembly and heat sink support device restrains movement of the heat sink. As indicated in col. 3, beginning at line 19, the heat sink is attached to a thermal plate of the processor card assembly which is then latched into the retention system. The invention disclosed in this patent then provides support for the heat sink which would otherwise apply undesirable forces to the processor card assembly.

Thus, the teaching one gets from this patent is that of mounting a processor card assembly with an attached heat sink perpendicular to the motherboard, using a conventional retention mechanism and also providing a support mechanism for the heat sink.

d. Freer et al. U.S. Patent 5,576,935

Freer et al. discloses a conventional arrangement for inserting expansion cards into a computer, plugging vertically into a motherboard.

4. Claims 16 and 17 are not anticipated by Sangveraphunsiri

Claims 16 and 17 require “inserting the edge connector of said processor *in a connector on said motherboard*, said processor having an orientation *parallel* ...” (Emphasis supplied). In Sangveraphunsiri, Figs. 21 and 22 illustrate inserting the module into the bay of a disk drive

which has a connector therein. Thus, the connector is not “*on said motherboard.*” In Fig. 20, the connector is on the motherboard but the processor is not “*parallel.*” Thus, Sangveraphunsiri does not anticipate these claims. Furthermore, the clear suggestion here is that when one wants to insert a processor module into a connector on the motherboard, it should be inserted vertically. Thus, Sangveraphunsiri teaches away from the claimed arrangement of a horizontal insertion into a connector on the motherboard.

5. Claims 1-5 and 8-11, are not obvious over Sangveraphunsiri, in view of Hayakawa et al.

As noted above, Sangveraphunsiri teaches two ways of mounting. In one the connector is on the motherboard and the module is perpendicular; in the other the module is not on the board and the module is horizontal or parallel. The connector 548' on the board does not receive an edge connector of the cartridge. In fact, the connector illustrated in Sangveraphunsiri is not an edge connector, but a connector with pins. The difference between these two kinds of connectors is not insubstantial when one considers the possibility of bending the pins.

The Examiner recognizes that Sangveraphunsiri lacks a teaching of guide rails and guide slots and a teaching of the motherboard connected to the edge connector in the parallel orientation as claimed. To find this teaching the Examiner turns to Hayakawa et al. In Hayakawa et al. a controller board 2-1 plugs into a printer control board 1-1. The controller board, although it contains a CPU 10, is not however a processor cartridge or even a processor board. It is a controller board that includes among other things a CPU. Furthermore, the structure shown and described does not have a case as do the claimed processor cartridge and Sangveraphunsiri. Board 1-1 does not have an edge connector. Rather a connector 2-3 mounted on the board 1-1 plugs into a connector 1-2 mounted on board 1-1.

Even if one assumes the obviousness or using guides as taught by Hayakawa et al., combining this reference with Sangveraphunsiri does not lead to the claimed combination. One would simply have the arrangement of Figs 21 and 22 with guides. The Examiner has not indicated why or how, despite the clear teaching of Sangveraphunsiri, one would modify that

reference, to eliminate the bay, and plug the module into a connector directly on the motherboard.

With regard to the embodiments of Fig. 21 and Fig. 22 of the primary reference, there would be no reason to use a different connector. Hayakawa et al. has no details of the connector. In particular, it does not suggest substituting an edge connector for the pinned connector of Sangveraphunsiri. Applicant submits such would be contrary to the teaching of Sangveraphunsiri. Sangveraphunsiri used an edge connector when inserting perpendicular to the motherboard, but did not do so when inserting parallel to the motherboard. Only in Applicant's specification is the claimed arrangement taught or suggested.

The Examiner contends that it would have been further obvious to have the processor visible from the exterior side. Applicant submits that if this were so obvious, Sangveraphunsiri would have done so. Applicant previously requested that, should the Examiner maintain this position, the Examiner provide support as required by MPEP 2144.03. Similarly, with regard to claims 9-11, support was requested, if the Examiner continued to maintain rejection of these claims. No support has been provided and, thus, the rejection of claims 5 and 9-11 should be withdrawn.

6. Claims 6 and 7 are not obvious over Sangveraphunsiri, in view of Hayakawa et al. and further in view of Feightner et al.

Granted, that the use of a heat sink with a processor is well known. However, particularly with regard to claim 7, Applicant submits that the Examiner has pointed to no teaching in the reference of providing a heat sink on the motherboard and also including the claimed connector for connecting the heat sink to the processor, particularly in combination with the other elements claimed. Note that in Feightner et al. a heat sink connected to the processor is supported. Here, the connector connects the heat sink to the processor. Once again, the rejection is unsupported despite Applicant's request for the citation of specific art to support the rejection

7. Claims 12-15 and 18 are not obvious over Sangveraphunsiri, in view of Hayakawa et al. and further in view of Freer et al.

Freer et al. is cited by the Examiner as teaching a motherboard having a slot for receiving a processor in addition to the basic elements alleged to be taught by Sangveraphunsiri, in view of Hayakawa. For the reasons given above, Applicant does not believe that the basic elements are present as the Examiner contends, using the teachings of the two primary references. Freer et al. adds nothing to these basic references. It discloses a conventional arrangement for inserting peripheral cards (not processors) into a computer, plugging vertically into the motherboard. A teaching of vertically plugging a processor module into the motherboard was already taught by the primary reference in Fig. 20. Thus, adding this teaching would only lead one to the arrangement shown in Fig. 20 of Sangveraphunsiri. The Examiner has pointed to no motivation to do otherwise.

8. The art as a whole teaches away from the claimed arrangement

Applicant submits that if one is faced with mounting a processor module with an edge connector to a mother board, the art as a whole would suggest, if the module was to be plugged into an edge connector on the motherboard, plugging that board into the motherboard in a perpendicular orientation. Only two of the references, Sangveraphunsiri and Feightner et al. are directed to plugging of processor modules. In both, when plugged into a connector on the board, they are in a perpendicular arrangement. The other reference showing an edge connector, Freer et al. also plugs in perpendicularly. Thus, Applicant submits that there is no teaching or suggestion of doing other than what Sangveraphunsiri, plugging into a connector on the board perpendicularly or utilizing a bay with a connector coupled by a cable to the motherboard. Neither of these arrangements meet the claimed limitations.

9. Conclusion

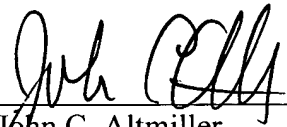
In view of the above, Applicant believes that all claims are in condition for allowance, prompt notice of which is respectfully solicited. If the Examiner believes for any reason that

personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

The Office is hereby authorized to charge any additional fees under 37 C.F.R. § 1.16 or § 1.17 or credit any overpayment to Deposit Account No. 11-0600.

Respectfully submitted,

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